

THIRD SEMESTER DIPLOMA EXAMINATION IN ENGINEERING AND  
TECHNOLOGY  
(Common to BM/EC/EL)

**DIGITAL ELECTRONICS**  
**MODEL QUESTION PAPER – SET 1**

Time: 3 hours

Maximum Marks: 75

**PART A**

**I. Answer all questions in one word or one sentence. Each question carries one mark.**

**(9x1=9 Marks)**

1	Decimal value of 10101 is.....	M1.01	U
2	Write the 1's complement of 1101	M1.01	U
3	Write the name of a universal logic gate and show its symbol	M1.03	R
4	Name the logic family with least power dissipation	M2.02	U
5	Number of control signals required for a 8 x 1 multiplexer is -----	M2.04	U
6	Name the type of logic circuit in which the output depends up on only the present input	M3.01	U
7	..... shift register has one input line and one output line	M3.03	U
8	In..... counter output is free from the clock signal.	M4.01	U
9	Name the type of memory typically used to store working data in a computer	M4.04	R

**PART B**

**II. Answer any eight questions from the following. Each question carries 3 marks**

**(8x3=24 Marks)**

1	Add the following numbers a) 35 + 19      b) 22.25 + 14.75	M1.01	U
2	State the importance of universal gates. Give examples and show the conversion of NAND gate to NOT gate	M1.03	U
3	Reduce the expression $Y = \sum m(0,2,3,4,5,6)$ using K map	M1.04	A
4	Write any three features of CMOS logic family	M2.02	U

5	Suggest a combinational logic circuit to select one data line at a time from two input data lines. Show the functional diagram and logic diagram	M2.04	A
6	Write the need for parallel adder. Draw the logic diagram of a 4 bit binary parallel adder	M2.04	U
7	Draw the logic symbol and truth table of a) D flip flop b) T flip flop. Mention their applications.	M3.02	U
8	Draw the logic diagram of 4 bit Johnson counter	M3.04	U
9	Write three differences between asynchronous counter and synchronous counter	M4.01	U
10	Write a brief note on different types of RAM	M4.04	U

**PART C**

**Answer all questions. Each question carries seven marks**

**(6x7=42Marks)**

III	Perform the following operations (i) Convert $(125)_{10}$ to hexadecimal (ii) $46 - 14$ using 8 bit 2's complement method (iii) Convert $(4BAC)_{16}$ to binary	M1.01	U
IV	<b>OR</b> Minimize the following expression using K map $F(A,B,C,D) = \sum m(1,4,7,10,13) + \sum d(5,14,15)$	M1.04	U
V	Beginning from the conversion table and with the help of K map design a 4 bit Binary to Gray code converter.	M2.04	U
VI	<b>OR</b> Mention the applications of Multiplexers and De multiplexers. With the help of logic diagram and truth table explain a 1 line to 4 line de multiplexer.	M2.04	U
VII	With the help of conversion table and K map show the conversion of JK flip flop to i) T flip flop and ii) D flip flop	M3.02	A
VIII	<b>OR</b> With necessary diagrams explain Johnson counter.	M3.04	U
IX	Write the difference between combinational and sequential logic circuits.	M3.01	U
X	<b>OR</b> With diagram explain the working of Parallel in – Serial out Shift register	M3.03	U
XI	With the logic diagram and timing diagram briefly explain a three bit ripple down counter	M4.02	U

	<b>OR</b>		
XII	Write short notes on different types of Read Only Memories	M4.04	U
XIII	Design and implement a mode 10 asynchronous counter using T flip flops.	M4.02	A
	<b>OR</b>		
XIV	Design and implement a 3 bit synchronous up counter.	M4.03	A

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**DIGITAL ELECTRONICS**  
**MODEL QUESTION PAPER – SET 2**

Time: 3 hours

Maximum Marks: 75

**PART A**

**III. Answer all questions in one word or one sentence. Each question carries one mark.**

**(9x1=9 Marks)**

1	Binary equivalent of Hexadecimal 10 is.....	M1.01	U
2	Write the 2's complement of 1011	M1.01	U
3	Write the name of logic gate whose output becomes high when anyone of its input becomes high	M1.03	R
4	Name the fastest logic family	M2.02	U
5	Number of control signals for a 4 x 1 multiplexer is ----	M2.04	U
6	-----type of logic circuits require clock input	M3.01	U
7	Shift registers use ----- type flip flops.	M3.03	U
8	Name the counter in which all the flip flops are triggered with same clock simultaneously	M4.01	U
9	Number of flip flops required for a mod 10 asynchronous counter is --- -.	M4.02	U

**PART B**

**IV. Answer any eight questions from the following. Each question carries 3 marks**

**(8x3=24 Marks)**

1	Convert the following hexadecimal numbers to decimal a) AB6    b) 124.56	M1.01	U
2	State De Morgan's theorems.	M1.04	U
3	Reduce the expression $Y = \overline{A}B + A\overline{B} + AB$ using K map	M1.03	A
4	Define a) Propagation delay b) Fan out	M2.02	U

5	Write the features of ECL logic family	M2.02	U
6	Starting from the truth table design an adder circuit for two binary inputs	M2.04	A
7	Draw the logic symbol and truth table of a) SR flip flop b) JK flip flop .	M3.02	U
8	List the applications of shift register and draw the diagram of 4 bit serial in – serial out shift register .	M3.03	U
9	Differentiate between Asynchronous counter and synchronous counter	M4.01	U
10	Compare RAM and ROM	M4.04	U

### PART C

**Answer all questions. Each question carries seven marks**

**(6x7=42Marks)**

III	Implement AND, OR, NOT and XOR gates using NAND gates only	M1.03	R
	<b>OR</b>		
IV	Write any 7 laws of Boolean Algebra	M1.04	U
V	From the truth table design a full adder.	M2.04	A
	<b>OR</b>		
VI	From the function table write the expression for the output of a 4 x 1 multiplexer and draw the logic diagram .	M2.04	A
VII	Draw the function diagram and truth table of JK, D, and T flip flops	M3.02	U
	<b>OR</b>		
VIII	Explain any two types of shift registers with diagrams.	M3.03	U
IX	Explain the working of SR flip flop with the help of a diagram using NAND gates.	M3.02	U
	<b>OR</b>		
X	Briefly explain the working of a ring counter with the diagram and truth table	M3.03	U
XI	With the logic diagram and timing diagram briefly explain a three bit ripple up counter	M4.02	A

	<b>OR</b>		
XII	Write short notes on ROM, PROM, EPROM, EEPROM	M4.04	U
XIII	Design a mod 6 asynchronous counter using T flip flop.	M4.02	A
	<b>OR</b>		
XIV	Design a synchronous mod 8 down counter using JK flip flop.	M4.03	A